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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,195	01/04/2002	Baoping Han	0789-150P	2065

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EXAMINER
ARNOLD JR, JAMES

ART UNIT	PAPER NUMBER
1764	5

DATE MAILED: 06/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/035,195	HAN ET AL.	
	Examiner	Art Unit	
	James Arnold, Jr.	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khulbe (USPN 4,299,685) in view of Jain (USPN 4,999,328) and Bearden (USPN 4,134,825).

The Khulbe reference discloses a process for hydroconverting a heavy hydrocarbon chargestock by passing heavy hydrocarbon oil and catalytically active fly ash or high ash coal and hydrogen through a hydrocracking zone. See Column 2, lines 60-69; Column 3, lines 40-47, and Column 10, lines 12-14 and Abstract. The reference discloses the use of catalytic material such as iron, tungsten, cobalt, molybdenum, and other catalytically active metals. See Column 3, lines 40-48. The reference discloses a hydrocracking reaction temperature between about 400 and 500 C, a pressure of at least

500 psig (3.44 MPa), and a liquid hourly space velocity between about 0.5 and 4. See Column 3, lines 1-5.

The reference does not disclose feeding the chargestock mixture in an upward way through the hydrocracking reaction zone. The reference does not disclose preheating the mixture to a required temperature before sending it through the hydrocracking reaction zone. The reference does not disclose the introduction of a solid powder at the position ¼ to ¾ of the total length of the reactor from the bottom so as to absorb the macromolecules of residue formed during the reaction and carry them out of the reactor. The reference does not disclose a solid powder wherein the pore diameter is no less than 10 nm or 15 nm and wherein in at least 50% of the particles have diameters of less than 45 micrometers or less than 10 micrometers. The reference does not disclose a process wherein the amount of said solid powder added is 0.01-4.0 % based on the total weight of the heavy hydrocarbon chargestock fed into the reactor. The reference does not disclose a process wherein the solid powder comprises a solid catalyst and/or a solid additive. The reference does not disclose Nickel, Zinc, and Potassium catalysts supported on a carrier such as alumina, silica-alumina, activated carbon, or amorphous aluminum silicate. The reference does not disclose a process wherein the solid additive is a solid particle that is less active or inert for hydrogenation. The reference does not disclose a process wherein the solid additive is a brown coal powder, activated carbon, alumina powder, the coke product of the coker, and/or the coke product of the suspension bed itself. The reference does not disclose a process wherein the solid powder is carried into the reactor with a hydrocarbon carrier oil; wherein the hydrocarbon carrier oil comprises the unconverted oil in the oil formed in the suspension bed, coker gatch, deasphalted oil,

and/or poor quality recycle oil; and wherein additional homogeneous catalyst is fed together with the feeding of the hydrocarbon recycle oil. The reference does not disclose a process wherein the hydrocracking conditions comprise a full temperature range of 300-600 C; a full liquid hourly volume space velocity of 0.1-2 or 0.3-1.5; and a hydrogen oil volume ratio of 100-2000 or 300-1500. The reference does not disclose a process wherein the homogeneous catalyst is one or more selected from the group consisting of oil soluble catalysts and water soluble catalysts, the amount of which is 0.01-1.0% based on the total weight of the heavy hydrocarbon chargestock fed into the reactor; wherein the amount of said homogeneous catalyst is 0.01-0.1% based on the total weight of said heavy hydrocarbon chargestock fed into the reactor; and wherein said homogeneous catalyst is a water soluble catalyst.

The Jain reference discloses the upward movement of the hydrocarbon chargestock through the hydrocracking zone. See Column 3, lines 35-40. The Bearden reference discloses the adding of a homogeneous oil soluble metal catalyst to a hydrocarbon feedstock and the pre-heating of the hydrocarbon chargestock and hydrogen. See Column 19, lines 49-58 and Column 20, lines 42-50.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Khulbe to include the upward movement of the hydrocarbon chargestock as disclosed by Jain because both references relate to the hydrocracking of heavy oils and because the Jain reference also discloses that upward and downward flow are acceptable in a hydrocracking zone reactions. See Column 3, lines 35-40. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Khulbe to utilize preheating of the

mixture to a required temperature before sending it through the hydrocracking reaction zone, as disclosed by Bearden, because preheating allows for a stable reaction zone. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the process of Khulbe to utilize a homogeneous oil soluble metal catalyst because both the Khulbe and Bearden references relate to the hydroconversion of heavy hydrocarbons. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a solid powder at the position ¼ to ¾ of the total length of the reactor from the bottom so as to absorb the macromolecules of residue formed during the reaction and carry them out of the reactor; a solid powder wherein the pore diameter is no less than 10 nm or 15 nm and wherein in at least 50% of the particles have diameters of less than 45 micrometers or less than 10 micrometers; a process wherein the amount of said solid powder added is 0.01-4.0 % based on the total weight of the heavy hydrocarbon chargestock fed into the reactor; and a process wherein the solid powder comprises a solid catalyst and/or a solid additive because Khulbe discloses the use of fly ash or high ash coal fines to remove carbonaceous material and it discloses small particle size and small weight percentage. See Abstract and Column 3, lines 35-50. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize Nickel, Zinc, and Potassium catalysts supported on a carrier such as alumina, silica-alumina, activated carbon, or amorphous aluminum silicate; to utilize a process wherein the solid additive is a solid particle that is less active or inert for hydrogenation; and to utilize a process wherein the solid additive is a brown coal powder, activated carbon, alumina powder, the coke product of the coker, and/or the coke product of the suspension bed itself because the reference Khulbe discloses

unspecified catalysts other than iron, tungsten, cobalt, and molybdenum; and since the catalyst is an active component the additive does not need a high degree of activity. See Column 3, line 46. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein the solid powder is carried into the reactor with a hydrocarbon carrier oil; wherein the hydrocarbon carrier oil comprises the unconverted oil in the oil formed in the suspension bed, coker gatch, deasphalted oil, and/or poor quality recycle oil; and wherein additional homogeneous catalyst is fed together with the feeding of the hydrocarbon recycle oil because hydrocarbons are reacted in the hydrocracking zone and therefore it would be appropriate to utilize hydrocarbon oil to deliver the solid powder into the reaction zone. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein the hydrocracking conditions comprise a full temperature range of 300-600 C; a full liquid hourly volume space velocity of 0.1-2 or 0.3-1.5; and a hydrogen oil volume ratio of 100-2000 or 300-1500 because an overlapping range of temperatures and liquid hourly volume space velocity are disclosed by the Khulbe reference and since the charge oil is passed into the hydrocracking zone in the presence of hydrogen it would be appropriate to use an amount of hydrogen in relation to oil that would be effective for hydrocracking. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a process wherein the homogeneous catalyst is one or more selected from the group consisting of oil soluble catalysts and water soluble catalysts, the amount of which is 0.01-1.0% based on the total weight of the heavy hydrocarbon chargestock fed into the reactor; wherein the amount of said homogeneous catalyst is 0.01-0.1% based on the total weight of said

heavy hydrocarbon chargestock fed into the reactor; and wherein said homogeneous catalyst is a water soluble catalyst because the Khulbe reference discloses 0.1-5.0% weight fly ash and the fly ash is coated with catalytic material and the reference discloses a broad range of catalytic materials. See Column 3, lines 35-50.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Herbstman (USPN 4,125,455) and Strausz (USPN 6,068,758). The Strausz reference discloses a process for hydrocracking heavy oil with an oil soluble catalyst. The Herbstman reference discloses the use of homogeneous catalysts in hydrotreating.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Arnold, Jr. whose telephone number is 703-305-5308. The examiner can normally be reached on Monday-Thursday 8:30 AM-6:00 PM; Fridays from 8:30 AM-5:00 PM with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

ja
June 2, 2003

Walter D. Griffin
Primary Examiner